

IN THE CLAIMS

1. (Currently Amended) A 3D camera for determining distances to regions in a scene comprising:

a photosurface having a plurality of pixels each of which comprises a circuit having a single light sensitive element that provides a current responsive to light incident thereon and wherein the circuit is controllable to modulate or gate the current without modulating or gating the incident light;

a light source;

a controller that controls the light source to illuminate the scene with gated or modulated light and wherein the controller gates or modulates current from the light sensitive element of a pixel in the photosurface responsive to the time dependence of the gating or modulation of the light and determines a distance to a region imaged on the pixel responsive to the gated or modulated current.

2. (Previously presented) A 3D camera according to claim 1 wherein the circuit comprises:

at least one amplifier, having an input and an output;

a feedback capacitor separate from the light sensitive element connected between the input and output of each of the at least one amplifier; and

at least one controllable connection through which current flows from the light sensitive element into the input of the at least one amplifier.

3. (Previously presented) A 3D camera according to claim 2 wherein the amplifier is an operational amplifier.

4. (Currently Amended) A 3D camera according to claim 2 wherein the circuit comprises at least one data buss and wherein the circuit comprises at least one address switch that connects a data buss of the at least one data buss to an output of one of the at least one amplifiers amplifier, either directly or via another switch.

5. (Previously presented) A 3D camera according to claim 2 wherein the at least one controllable connection comprises at least one gate switch and the controller opens and closes the at least one gate switch to gate the pixel on and off and determines a distance to a

region imaged on the pixel responsive to an amount of charge integrated on the feedback capacitor of the at least one amplifier during times at which the pixel is gated on.

6. (Previously presented) A 3D camera according to claim 5 wherein the at least one gate switch comprises a single gate switch that connects the light sensitive element to one amplifier.

7. (Withdrawn) A 3D camera according to claim 6 wherein the capacitor is connected to the at least one amplifier by a plurality of connection switches such that:

for a first combination of open and closed connection switches a first terminal of the capacitor is connected to the input of the amplifier and a second terminal of the capacitor is connected to the output of the amplifier; and

for a second combination of open and closed connection switches the first terminal of the capacitor is connected to the output of the amplifier and the second terminal of the capacitor is connected to the input of the amplifier.

8. (Withdrawn) A 3D camera according to claim 7 wherein the controller controls the light source to illuminate the scene with a plurality of light pulses, each having a pulse width and wherein the controller gates pixels in the photosurface on or off at times responsive to times at which light pulses of the plurality of light pulses are radiated.

9. (Withdrawn) A 3D camera according to claim 8 wherein the controller gates a pixel on for a first gate period following each light pulse in the plurality of light pulses and wherein during the first gate period the controller controls the connection switches according to the first combination and current from the pixel's light sensitive element responsive to background light and light from the radiated light pulse reflected by a region imaged by the pixel plus dark current is integrated on the capacitor and increases voltage across the capacitor.

10. (Withdrawn) A gated 3D camera according to claim 9 wherein the controller gates the pixel on for a second gate period following each light pulse in the plurality of light pulses and wherein during the second gate period light from the light pulse reflected by the region does not reach the pixel and the controller controls the connection switches according to the second combination so that dark current and current from the pixel's light sensitive element

responsive to background light is integrated on the capacitor and decreases voltage across the capacitor.

11. (Withdrawn) A 3D camera according to claim 5 wherein the at least one amplifier comprises first and second amplifiers having first and second feedback capacitors respectively and the at least one gate switch comprises first and second gate switches, the first gate switch connecting the light sensitive element to the input of the first amplifier and the second gate switch connecting the light sensitive element to the input of the second amplifier.

12. (Withdrawn) A 3D camera according to claim 11 wherein the at least one address switch comprises first and second address switches, the first address switch connecting the output of the first amplifier to the data buss and the second address switch connecting the output of the second differential amplifier to the data buss.

13. (Withdrawn) A 3D camera according to claim 11 wherein the circuit additionally comprises a differential amplifier having positive and negative inputs and an output, wherein the output of the first amplifier is connected to the positive input of the differential amplifier, the output of the second amplifier is connected to the negative input of the differential amplifier and wherein the output of the differential amplifier is connected by the at least one address switch to the data buss.

14. (Withdrawn) A 3D camera according to claim 11 wherein the controller controls the light source to illuminate the scene with a plurality of light pulses, each having a pulse width, and wherein the controller gates pixels in the photosurface on or off at times responsive to times at which light pulses of the plurality of light pulses are radiated.

15. (Withdrawn) A 3D camera according to claim 14 wherein the controller is operative to:

gate pixels on for a first gate period after a first time lapse following each radiated light pulse of a first plurality of radiated light pulses such that current from the light sensitive element is integrated by the first capacitor; and

gate pixels on for a second gate period after a second time lapse following each radiated light pulse of a second plurality of radiated light pulses such that current from the light sensitive element is integrated by the second capacitor.

16. (Withdrawn) A 3D camera according to claim 15 wherein the mid points of first and second gate periods are delayed with respect to the radiated light pulses that they respectively follow by the same amount of time.

17. (Withdrawn) A 3D camera according to claim 15 wherein the duration of the first gate period is substantially equal to the pulse width of the radiated light pulses.

18. (Withdrawn) A 3D camera according to claim 15 wherein the duration of the second gate is greater than or equal to three times the pulse width.

19. (Withdrawn) A 3D camera according to claim 15 wherein the first time lapse is such that light reflected by a region in the scene from the light pulse reaches a pixel on which the region is imaged during the first gate period, and current from the pixel's light sensitive element responsive to background light, light reflected from the radiated light pulse by the region plus dark current is integrated on the first capacitor.

20. (Withdrawn) A 3D camera according to claim 14 wherein the second time lapse is such that light reflected by a region in the scene from the light pulse does not reach the light sensitive element during the second gate period and current from the pixel's light sensitive element responsive to background light plus dark current is integrated on the second integrator.

21. (Withdrawn) A 3D camera according to claim 10 wherein the duration of the first gate and the duration of the second gate are controlled to be substantially equal.

22. (Withdrawn) A 3D camera according to claim 21 wherein the duration of the first and second gates is substantially equal to the pulse width of the radiated light pulses.

23. (Previously presented) A 3D camera according to claim 5 wherein the circuit comprises a reset switch connected to the light sensitive element and wherein when the reset switch is closed, voltage across the light sensitive element is set to a predetermined magnitude.

24. (Previously presented) A 3D camera according to claim 23 wherein before the controller gates a pixel on, the controller closes and opens the reset switch of the pixel at least once so that voltage across the light sensitive element is the same each time the pixel is gated on.

25. (Previously presented) A 3D camera according to claim 5 wherein the controller gates at least one pixel in the photosurface independently of other pixels in the photosurface.

26. (Previously presented) A 3D camera according to claims 25 wherein pixels in the photosurface are grouped into different pixel groups and pixels in a same pixel group are gated on and off by the controller simultaneously and wherein each pixel group is controlled independently of other pixel groups.

27. (Previously presented) A 3D camera according to claim 1 wherein the controller controls the light source to illuminate the scene with a plurality of light pulses, each having a pulse width, and wherein the controller gates pixels in the photosurface on or off at times coordinated with times at which light pulses of the plurality of light pulses are radiated.

28. (Withdrawn) A 3D camera according to claim 2 wherein the at least one controllable connection comprises at least one modulator.

29. (Withdrawn) A 3D camera according to claim 28 wherein the at least one modulator comprises one modulator that connects the light sensitive element to the input of one amplifier.

30. (Withdrawn) A 3D camera according to claim 28 wherein the controller controls the at least one modulator to modulate the current from the light sensitive element harmonically.

31. (Withdrawn) A 3D camera according to claim 28 wherein the at least one modulator is controllable to modulate the current from the light sensitive element pseudo randomly.

32. (Withdrawn) A 3D camera according to claim 30 wherein the modulated light is harmonically modulated.

33. (Withdrawn) A 3D camera according to claim 32 wherein the modulated light and the current are modulated at a same frequency of modulation.

34. (Withdrawn) A 3D camera according to claim 33 wherein the modulation of the light and the current are in phase.

35. (Withdrawn) A 3D camera according to claim 28 wherein current from the light sensitive element of at least two pixels is modulated at different frequencies.

36. (Withdrawn) A photosurface comprising a plurality of light sensitive pixels, wherein each pixel of the plurality of pixels comprises an electronic circuit, each of the circuits comprising:

- a light sensitive element that provides a current responsive to light incident thereon;

- at least one amplifier, having an input and an output;

- a feedback capacitor having first and second terminals connected respectively to the input and output of the at least one amplifier by a plurality of switches, which switches are controllable to reverse the connections of the capacitor such that the second and first terminals are connected respectively to the input and output of the at least one amplifier respectively; and

- at least one additional switch that connects the light sensitive element to the input of the amplifier, wherein when the additional switch is closed, current provided by the light sensitive element flows into the amplifier input.

37 - 41 (Cancelled)